

Notice of Allowability

Application No.

10/759,497

Examiner

Henry S. Hu

Applicant(s)

FUKUSHI ET AL.

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment of April 11, 2006.
2. ☒ The allowed claim(s) is/are 1-18.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 4-22-2004
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

1. This Office Action is in response to **Response (no amendment included)** filed on April 11, 2006. Applicants' Response is responding to **Examiner's non-final office action (for 1st RCE) of January 31, 2006** (it was Final and then became Non-Final), no claim was amended, cancelled or added. **Claims 1-18 are now pending** with three independent claims (Claim 1, Claim 15 and Claim 18). An action follows.

2. Claim rejections under **Non-Final Office Action (after RCE)** filed on January 31, 2006 are now removed for the reasons given in paragraphs 3-10 thereafter.

Allowable Subject Matter

3. Claims 1-18 are allowed.

4. The following is an examiner's statement of reasons for allowance: The above Claims 1-18 are allowed over the closest references:

5. *The limitation of parent Claim 1 of the present invention relates to a compound comprising: (a) an elastomeric copolymer having interpolymers having monomeric units derived from vinylidene fluoride monomer, at least one cure site moiety, and substantially no*

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perfluorinated vinyl ether monomers; (b) a peroxide curable component; (c) at least one mineral filler, such that upon vulcanization the resulting compound has a retraction at lower temperature (TR-10) of -20°C or less, and (d) a peroxide.

Parent Claim 15 relates to Claim 1 using two specified monomers in component (a) and without the limitation of using mineral filler, while other parent Claim 18 relates to the process of forming a compound of Claim 1. See other limitations of dependent Claims 2-14 and 16-17.

6. Applicants have now claimed in twice-amended parent Claim 1 of this RCE an unexpected way of obtaining a curable fluoroelastomeric composition comprising four major components as: (a) an elastomeric copolymer of vinylidene fluoride, at least one cure site moiety, and substantially no perfluorinated vinyl ether monomers; (b) a peroxide curable component; (c) at least one mineral filler, and (d) a peroxide. Applicants further allege that upon vulcanization the resulting compound has a retraction at lower temperature (TR-10) of -20°C or less.

Parent Claim 15 relates to Claim 1 but using two specified monomers in component (a) and without the limitation of using mineral filler; other parent Claim 18 is related to a process of forming the compound of Claim 1. It is noted that peroxide as component (d) is now required to be with component (b) in all three parent claims.

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As suggested by the Examiner, parent **Claim 18** has been amended by the Applicants to be consistent with other parent Claims 1 and 15. In view of the fact that all three parent **Claims 1, 15 and 18** now require to use the same combination from a peroxide curable component (b) and a peroxide compound (d), both 103 rejections over Paglia/Araki or Brinati/Araki respectively cannot stand as follows:

7. Primary reference **Brinati** in each of his US and EP patents may have disclosed the preparation of fluoroelastomers (containing **no perfluorinated vinyl ether monomer**) so as to carry a low Tg and **a low compression set at low temperature** (equivalent to TR 10). However, Brinati only uses a phosphorus-containing curing accelerator when the non-cure-site-containing fluorinated blend is subjected to routine vulcanization with conventional fillers in order to make articles. The primary reference Brinati is therefore silent about **adding “a cure site moiety” in the course of copolymerization** so as to be curable by peroxide.

Both types of crosslinking reactions including **slow and rapid routes** may have been disclosed or suggested by primary reference **Paglia**. For instance, various cure-site monomers including bromine, iodine, chlorine and nitrile as well as a diiodine compound such as 1,3-diiodoperfluoropropane can be incorporated in the co-polymerization of fluorinated copolymers; such reactive cure sites in the copolymers will improve crosslinkability so as to obtain better mechanical properties. However, a UV curing system at room temperature has been **explicitly** applied.

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8. It is noted by this Examiner that **a UV curing mechanism is quite different from peroxide curing mechanism.** In most of the cases, having obtained a UV curable composition does not necessarily obtain a peroxide curing composition since many other factors may be involved. The matter of photo-stability may be a key concern.

As exactly pointed out by the Applicants in both 103 rejection cases, the secondary reference **Araki** does not teach or suggest two things as following: (A) how to improve low temperature properties such as TR10, and (B) using a specific copolymer having substantially **no** perfluorinated vinyl ether monomer or the copolymer being structurally different (see page 7 bottom as well as page 11 middle of earlier Remarks). A linking motivation in both rejections is thereby lacking.

9. It is known in the art that **such a combination of four factors is quite different from each individual factor in view of criticality.** It is also known in the art that even the difference is only one carbon atom in the composition or a tiny extra step in the making, the final polymeric products can be with very much different properties.

For the record, the present invention has already shown **unexpected results** in examples along with some comparative examples for making such a peroxide-curable fluoroelastomeric composition having such a TR 10 value (see pages 9-14 for **examples 1-7** with control examples 1-3 and Tables 1-2). **Particularly see Comparison Table on page 10 of Remarks for the definition of the value and property of TR 10.** Therefore, the above-mentioned three

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references, in combination or alone, does not teach or fairly suggest the limitations of present invention.

10. After further examination and search, the examiner found the following prior art did not teach the claimed limitation:

US Patent No. **6,191,208 B1 to Takahashi** et al. disclose a curable perfluoroelastomer composition comprising (A) a perfluoroelastomer having units of TFE, PAVE and a nitrile-containing monomer, (B) a curing agent, and (C) anhydrous silica (abstract, line 1-7; column 1, line 50-62). The **nitrile-containing monomers** are 8-CNVE or the like, which **are related to derivatives of perfluorinated vinyl ethers** (column 2, line 60 – column 3, line 25). **No VDF** is used in the copolymer at all. No peroxide is added. Therefore, Takahashi fails to teach or fairly suggest the limitation of present invention.

US Patent No. **5,384,374 to Guerra** et al. disclose a curable perfluoroelastomer composition comprising (A) a perfluoroelastomer having units of VDF and HFP, (B) a fluorinated ether composition comprising a functional fluoro-aliphatic mono- or polyether curing agent, and (C) some curatives and additives (abstract, line 1-4; column 3, line 27-57; column 5, line 3 – column 6, line 57). **No cure-site monomer** is used in the copolymer at all. No peroxide is added. Therefore, Guerra fails to teach or fairly suggest the limitation of present invention.

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11. The key issue on making a curable fluoroelastomeric composition comprising four major components as: (a) an elastomeric copolymer of vinylidene fluoride, at least one cure site moiety, and substantially no perfluorinated vinyl ether monomers; (b) a peroxide curable component; (c) at least one mineral filler, and (d) a peroxide so that upon vulcanization the resulting compound has a retraction at lower temperature (TR-10) of -20°C or less, cannot be overcome by any or the combination of the above references, therefore, the present invention is novel.

12. As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary skill in the art. Therefore, the three independent and parent **Claims 1, 15 and 18** are allowed for the reason listed above. Since the prior art of record fails to teach the present invention, the remaining pending dependent **Claims 2-14 and 16-17** are passed to issue.

13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu** whose telephone number is (571) 272-1103. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization

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where this application or proceeding is assigned is (571) 273-8300 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Henry S. Hu

Patent Examiner, art unit 1713, USPTO

May 15, 2006



DAVID W. WU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700